

## WHAT IS CLAIMED:

1. An isolated DNA molecule encoding an HG20 polypeptide comprising an amino acid sequence selected from the group consisting of:
  - 5 SEQ.ID.NO.:2;
  - Positions 9-941 of SEQ.ID.NO.:2;
  - Positions 35-941 of SEQ.ID.NO.:2;
  - Positions 36-941 of SEQ.ID.NO.:2;
  - Positions 38-941 of SEQ.ID.NO.:2;
  - 10 Positions 39-941 of SEQ.ID.NO.:2;
  - Positions 42-941 of SEQ.ID.NO.:2;
  - Positions 44-941 of SEQ.ID.NO.:2;
  - Positions 46-941 of SEQ.ID.NO.:2;
  - Positions 52-941 of SEQ.ID.NO.:2; and
  - 15 Positions 57-941 of SEQ.ID.NO.:2.
2. The isolated DNA molecule of claim 1 comprising a nucleotide sequence selected from the group consisting of:
  - SEQ.ID.NO.:1;
  - 20 Positions 293-3,115 of SEQ.ID.NO.:1;
  - Positions 317-3,115 of SEQ.ID.NO.:1;
  - Positions 395-3,115 of SEQ.ID.NO.:1;
  - Positions 398-3,115 of SEQ.ID.NO.:1;
  - Positions 404-3,115 of SEQ.ID.NO.:1;
  - 25 Positions 407-3,115 of SEQ.ID.NO.:1;
  - Positions 416-3,115 of SEQ.ID.NO.:1;
  - Positions 422-3,115 of SEQ.ID.NO.:1;
  - Positions 428-3,115 of SEQ.ID.NO.:1;
  - Positions 446-3,115 of SEQ.ID.NO.:1; and
  - 30 Positions 461-3,115 of SEQ.ID.NO.:1.
3. An isolated DNA molecule that hybridizes under stringent conditions to the DNA molecule of claim 2.

4. An expression vector comprising the DNA of  
claim 1.
5. A recombinant host cell comprising the expression vector of  
claim 4.
6. The recombinant cell of claim 5 further comprising an  
expression vector comprising DNA encoding a protein selected from the group  
consisting of:
7. A protein, substantially free from other proteins, comprising an  
HG20 protein having an amino acid sequence selected from the group consisting of:  
SEQ.ID.NO.:2;  
Positions 9-941 of SEQ.ID.NO.:2;  
Positions 35-941 of SEQ.ID.NO.:2;  
Positions 36-941 of SEQ.ID.NO.:2;  
Positions 38-941 of SEQ.ID.NO.:2;  
Positions 39-941 of SEQ.ID.NO.:2;  
Positions 42-941 of SEQ.ID.NO.:2;  
Positions 44-941 of SEQ.ID.NO.:2;  
Positions 46-941 of SEQ.ID.NO.:2;  
Positions 52-941 of SEQ.ID.NO.:2; and  
Positions 57-941 of SEQ.ID.NO.:2.
8. A heterodimer comprising the protein of claim 7 and a G-  
protein coupled receptor protein where the heterodimer is substantially free from  
other proteins.
9. The heterodimer of claim 8 where the heterodimer is held  
together by N-terminal Sushi repeats, C-terminal alpha-helical interacting domains,  
coiled-coil domains, transmembrane interactions, or disulfide bonds.

10. A polypeptide comprising a coiled-coil domain from a first GABA<sub>B</sub> receptor subunit and no other contiguous amino acid sequences longer than 5 amino acids from the first GABA<sub>B</sub> receptor subunit where the coiled-coil domain is present in the C-terminus of the GABA<sub>B</sub> receptor subunit and mediates  
 5 heterodimerization of the first GABA<sub>B</sub> receptor subunit with a second GABA<sub>B</sub> receptor subunit.

11. The polypeptide of claim 10 where the coiled-coil domain is selected from the group consisting of: positions 756-829 of SEQ.ID.NO.:2; positions  
 10 779-814 of SEQ.ID.NO.:2; positions 886-949 of SEQ.ID.NO.:21; and positions 889-934 of SEQ.ID.NO.:21.

12. An isolated DNA molecule encoding a GABA<sub>B</sub>R1a polypeptide comprising the amino acid sequence SEQ.ID.NO.:20.  
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13. A protein, substantially free from other proteins, comprising a GABA<sub>B</sub>R1a protein having the amino acid sequence SEQ.ID.NO.:20.

14. A method for determining whether a substance binds GABA<sub>B</sub> receptors and is thus a potential agonist or antagonist of the GABA<sub>B</sub> receptor that comprises:  
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(a) providing cells comprising an expression vector encoding HG20 and an expression vector encoding GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b;

(b) culturing the cells under conditions such that HG20 and GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b are expressed and heterodimers of HG20 and GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b are formed;  
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(c) exposing the cells to a labeled ligand of GABA<sub>B</sub> receptors in the presence and in the absence of the substance;

(d) measuring the binding of the labeled ligand to the heterodimers  
 30 of HG20 and GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b;

where if the amount of binding of the labeled ligand is less in the presence of the substance than in the absence of the substance, then the substance is a potential agonist or antagonist of GABA<sub>B</sub> receptors.

15. A method of identifying agonists and antagonists of HG20 comprising:

- (a) providing test cells by transfecting cells with:
  - (1) an expression vector that directs the expression of HG20 in the cells; and
  - (2) an expression vector that directs the expression of GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b in the cells;
- (b) exposing the test cells to a substance that is suspected of being an agonist of the GABA<sub>B</sub> receptor;
- (c) measuring the amount of a functional response of the test cells that have been exposed to the substance;
- (d) comparing the amount of the functional response exhibited by the test cells with the amount of the functional response exhibited by control cells;
 

wherein if the amount of the functional response exhibited by the test cells differs from the amount of the functional response exhibited by the control cells, the substance is an agonist or antagonist of the GABA<sub>B</sub> receptor;

where the control cells are cells that have not been transfected with HG20 and GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b but have been exposed to the substance or are test cells that have not been exposed to the substance.

16. A method of producing functional GABA<sub>B</sub> receptors in cells comprising:

- (a) transfecting cells with:
  - (1) an expression vector that directs the expression of HG20 in the cells; and
  - (2) an expression vector that directs the expression of GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b in the cells;
- (b) culturing the cells under conditions such that heterodimers of HG20 and GABA<sub>B</sub>R1a or GABA<sub>B</sub>R1b are formed where the heterodimers constitute functional GABA<sub>B</sub> receptors.

17. An antibody that binds specifically to HG20 where HG20 has an amino acid sequence selected from the group consisting of:

SEQ.ID.NO.:2;

5 Positions 9-941 of SEQ.ID.NO.:2;  
 Positions 35-941 of SEQ.ID.NO.:2;  
 Positions 36-941 of SEQ.ID.NO.:2;  
 Positions 38-941 of SEQ.ID.NO.:2;  
 Positions 39-941 of SEQ.ID.NO.:2;  
 Positions 42-941 of SEQ.ID.NO.:2;  
 Positions 44-941 of SEQ.ID.NO.:2;  
 Positions 46-941 of SEQ.ID.NO.:2;  
 Positions 52-941 of SEQ.ID.NO.:2; and  
 10 Positions 57-941 of SEQ.ID.NO.:2.

18. A method of expressing a truncated version of HG20 protein comprising:

- 15 (a) transfecting a host cell with a expression vector that encodes an HG20 protein that has been truncated at the amino terminus;  
 (b) culturing the transfected cells of step (a) under conditions such that the truncated HG20 protein is expressed.

*Sub B4*  
 20 19. A chimeric HG20 protein having an amino acid sequence of HG20 selected from the group consisting of:

Positions 51-941 of SEQ.ID.NO.:2;  
 Positions 52-941 of SEQ.ID.NO.:2;  
 Positions 53-941 of SEQ.ID.NO.:2;  
 Positions 54-941 of SEQ.ID.NO.:2;  
 25 Positions 55-941 of SEQ.ID.NO.:2;  
 Positions 56-941 of SEQ.ID.NO.:2;  
 Positions 57-941 of SEQ.ID.NO.:2; and  
 Positions 58-941 of SEQ.ID.NO.:2;

covalently linked at the N-terminus with a non-HG20 amino acid sequence.

*add B-5*